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Translation

JAPANESE KOKAI PATENT, HEI 5-121057

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TITLE OF INVENTION : SEALING MATERIAL FOR AIR BATTERY

Application No. and Date : HEI 3-279231, October 25, 1991

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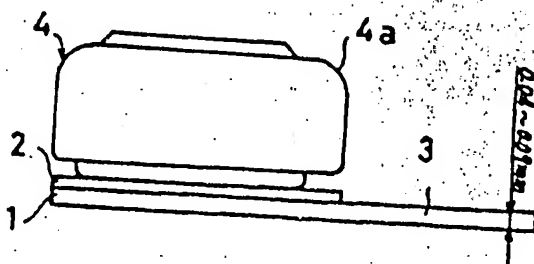
REFERENCE
Patent Department
Eveready Battery Company, Inc.

DPF

Abstract

[Object] A sealing material to seal off the through-hole 4b of an air battery 4 equipped with an anode casing 4a having a through-hole 4b to take the air into the bottom part. Thickness of the handler 3 of the sealing material 1 is checked, in order to prevent separation of the seal from the surface of the battery, caused by application of stress from outside, such as shock or vibration, etc. on the handle 3 of the sealing material 1 made of a gas impermeable plastic film. Thus, this invention intends to provide an air battery which excels in battery performance.

[Constitution] This invention uses a sealing material 1 where the thickness of the handler 3 is set in a 0.04 - 0.09 mm range, to prevent separation of the seal and to maintain a tight contact between the bottom of the anode casing 4a and the seal perfectly even when a large shock was given to the handle 3 of the sealing material 1 during shipment or during packing the battery 4.



Specification

Claim

A seal for air battery, which is used to tightly seal the through-hole of the air battery equipped with an anode casing having a through-hole to take the air into the bottom part, as characterized by keeping the thickness of the handle of the sealing material made of a gas impermeable plastic film coated on one side with an adhesive, and protruding out of the outer edge of the air battery, in a 0.04 - 0.09 mm range.

Comprehensive explanation of invention

[0001]

[Field of commercial utility]

This invention relates to improvement of a seal for air battery, which is used to seal off the through-hole which is designed to take the air into the anode casing of a button type air battery.

[0002]

[Prior art]

Traditionally, a seal that is coated on one side with an adhesive to tightly seal the through-hole in the bottom part of the anode casing and has a handle protruding from the outer edge of the air battery is used as the seal for air battery. The reason of using such a seal that has such a handle is a need to let the air into the battery during its use. Therefore, it requires a handle that has a function also to peel off the seal and to take in the air from the through-hole into the battery after peeling off the seal.

[0003]

Because the handle which is used to peel off the seal has to be pulled with a finger and it is easier to pull the handle that has a larger area, user is demanding for a larger area for the handle.

[0004]

[Problems to be solved by the invention]

However, since the bonding area of the bottom part of the casing and the seal which is used to seal off the through-hole located at the bottom part of the anode casing of the air battery is decided by the outer diameter of the battery, enlarged area of the handle of the sealing material may be larger than the contacting area of the seal and the bottom part of the anode casing in the battery that has an extremely small outer diameter. And, when the battery vibrates during its shipment, the stress being added to the handle from the outside will become the force that peels off and separate seal from the bottom part of the anode casing when a seal having a thick handle is used, and as a result the bond will be broken.

[0005]

Thus, with a battery that has an extremely small outer diameter, thick handle which is to be used to peel off the seal may often cause the bond between the seal and the bottom part of the anode casing to break during shipment or during the work. Such poor bonding of the seal is linked to self discharge or evaporation of electrolyte solution caused by invasion of air through the through-hole in the bottom part of the battery during storage of the battery, and thus it will speed up the breakdown of the battery.

[0006]

[Means to solve the problem]

This invention relates to a seal that can tightly seal the through-hole in the bottom part of the anode casing of air battery. This invention solves the problem by keeping the thickness of the handle of the sealing material made of a gas impermeable plastic film coated on one side with an adhesive, which protrudes out from the outer edge of the air battery, in 0.04 - 0.09 mm range.

[0007]

[Function]

This invention employs a seal for air battery, that has a handle with a thickness of 0.04 - 0.09 mm to absorb the stress being applied on the handler coming from outside, even when a large vibration occurred during shipment of the battery or when the large surface area of the handle becomes an obstacle during the course of handling the battery, such as packing the battery.

[0008]

As a result, even with the battery that has an extremely small outer diameter, separation of the bonded area of the seal from the bottom part of the anode casing will never occur, and the bond can be maintained perfectly.

[0009]

[Examples]

An embodied example of this invention is explained in the following.

[0010]

Fig. 1 and Fig. 2 are an embodied example of this invention, where 1 is a gas impermeable sealing material made of polyethylene terephthalate (polyester) film, and thickness of the material is 0.04 - 0.09 mm. The gas impermeable sealing material 1 is made, normally, from a plastic material such as polyester, polyethylene, or polyvinyl chloride and so on, or such plastic material on which aluminium vapor was deposited on its surface. 2 is an adhesive layer, which is made of an adhesive of acrylic ester series. Generally, a re-peelable adhesive having a thickness of 0.02 mm or thereabout is used. 3 is the handle which is formed by punching out the sealing material 1 in a certain desired shape, using a Thomson type puncher. 4 is the battery, where the through-hole 4b in the bottom part of the anode casing 4a is bonded and sealed with the seal of this example.

[0011]

One hundred batteries using the seal of the prior art (thickness of the material = 0.10 mm) and 100 batteries using the seal of this example (thickness of the material = 0.04 - 0.09 mm) were packed, respectively, in a packaging tray container.

The container was dropped on the surface of the concrete 20 times from the height of 1 m, and the number of seals which were broken was counted and the results were compared. Results are presented in Table 1.

[0012]

[Table 1]

[0013]

As clearly shown in Table 1, with the air batteries that had used the seal of the prior art, separation of seal occurred in many occasions. In contrast, with the air batteries that had used the seal of this Example, there was no separation of seal at all.

Table 1

Thickness of sealing material	Number separated
0.04 - 0.05 mm	0/100
0.06 - 0.07 mm	0/100
0.08 - 0.09 mm	0/100
0.10 - 0.11 mm	7/100
0.12 - 0.13 mm	22/100

[0014]

[Effect of invention]

As explained above, this invention is a seal for air battery, which is used to tightly seal the through-hole in the air battery which is equipped with an anode casing having a through-hole to take the air into the bottom part. By setting the thickness of the handle of the sealing material made of a gas impermeable plastic film coated with adhesive on one side, which protrudes from the outer edge of the air

air battery, in 0.04 - 0.08 mm range, this invention increases the flexibility and softness of the handle so that, even when a stress such as shock or vibration was applied, it will never peel and separate from the air battery.

Brief explanation of drawings

Fig. 1 is a side view of the air battery which is equipped with the seal of the embodied example of this invention.

Fig. 2 is an underside view of the air battery which is equipped with the seal of the embodied example of this invention.

1.....Sealing material, 2....adhesive layer, 3....handle,
4.....battery, 4a....anode casing, and 4b.....through-hole.

Fig. 1

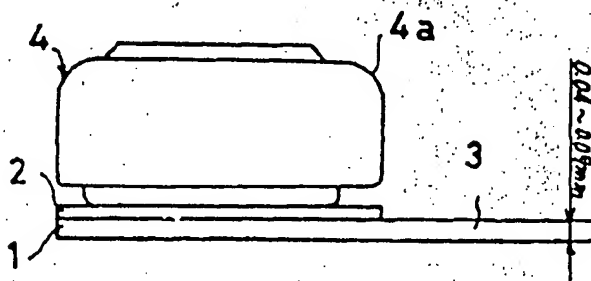


Fig. 2

